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Kenji SUETSUGU^{a,*}, Masakazu NAKAMA^b, Taduko WATANABE^c, Hiromitsu WATANABE^c
and Masatsugu YOKOTA^d: **The Northernmost Locality of *Gastrodia shimizuana***
(*Orchidaceae*)

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Summary: *Gastrodia shimizuana* Tuyama with flowers was found in the northern part of Okinawa Island, Okinawa Pref., the Ryukyu Islands. This is the first record for *G. shimizuana* from Okinawa Island, and this habitat represents the northernmost locality of the species.

Several lineages of land plants have evolved total dependence on fungal-derived energy sources, and are thus known as mycoheterotrophs (Leake 1994). The genus *Gastrodia* is a group of mycoheterotrophic orchids distributed in temperate and tropical areas of Madagascar, Asia and Oceania (Chung and Hsu 2006). The genus contains ca. 40 species and is characterized by fleshy tuber or coralloid underground stem, the absence of leaves, the union of sepals and petals and two mealy pollinia without caudicles (Dressler 1993, Leou 2000). *Gastrodia* shows extraordinary morphological diversity. Some species of sect. *Gastrodia* (sensu Schlechter 1911), such as *G. elata* Blume, reach 60–100 cm in height during flowering period. In contrast, many species of sect. *Codonanthus* (Schlechter 1911, Tuyama 1967) represented by *G. verrucosa* Blume (the *Gastrodia verrucosa* group), have inflorescences only 3–15 cm long during the flowering time but 30–40 cm long during the fruiting time, with elongated pedicels (Chung and Hsu 2006).

Plants belonging to the latter group are rarely found during the flowering season, and thus have not been studied intensively (Tuyama 1982). Of Japanese *Gastrodia* six species belong to sect. *Codonanthus*: *G. boninensis* Tuyama, *G. confusa* Honda & Tuyama, *G. nipponica* (Honda) Tuyama, *G. pubilabiata* Sawa and *G. shimizuana* Tuyama.

Gastrodia shimizuana was described based on a collection from Iriomote Island, the Ryukyu Islands. No further collections were made until Kobayashi and Yukawa (2001) rediscovered flowering plants of *G. shimizuana* in two other populations on Iriomote Island. Recently Chung and Hsu (2006) found the species in the mountains of Beixinzhuang in northern Taipei, Taiwan. In Japan, *G. shimizuana* is categorized as a Critically Endangered (CR) species in the Red Data Book of the Ministry of Environment.

During our recent field survey we found plants belonging to a species of flowering *Gastrodia* in the northern part of Okinawa Island, Okinawa Prefecture, in the Ryukyu Islands. The *Gastrodia* species we found has three conspicuous characteristics: a pubescent lip, two deltoid keels on the lip, and a column with wings. Within the sect. *Codonanthus*, a lip with two deltoid keels and a winged column are known to occur in *G. pubilabiata* and *G. shimizuana*. Our material is similar



Fig. 1. Flowering plant of *Gastrodia shimizuana* Tuyama from the northern part of Okinawa Island, Okinawa Pref., 6 March 2011 (photographed by T. Watanabe).

to *G. pubilabiata* in the aforementioned characteristics, but it is clearly distinct in having a spreading free part of the dorsal sepal (vs. porrect), a widely ovate free part of the petals (vs. ovate-lanceolate), a semiorbicular or deltoid lip blade (vs. rhombic), a column shorter than the lip (vs. longer than lip), yellowish-brown flowers (vs. dark brown), an orange and cream lip (vs. dark brown), and a flowering period of February to March (vs. September to October).

These characteristics generally agree with the description of *G. shimizuana* (Tuyama 1982, Kobayashi and Yukawa 2001, Chung and Hsu 2006), although previous descriptions of *G. shimizuana* showed this species has some intraspecific variations. For example, whilst Tuyama (1982) noted acuminate petals and a subdensely pustular lip, the specimens examined by Kobayashi and Yukawa (2001) do not share such characteristics. In addition, the specimen

examined by Chung and Hsu (2006) differs in lip structure from the Irimote Island specimens, with one keel in the middle (vs. two keels). The characteristics of our specimens are quite similar to the *G. shimizuana* that Kobayashi and Yukawa (2001) collected from Irimote Island, in that both of them have a pubescent lip and two deltoid keels on the lip. We therefore conclude that our material is ascribed to *G. shimizuana*, and that it represents the first record for *G. shimizuana* from Okinawa Island and the northernmost occurrence of the species.

Gastrodia shimizuana Tuyama in Acta Phytotax. Geobot. **33**: 380 (1982).

Specimen examined: JAPAN. The Ryukyus. Okinawa Pref., Okinawa Island, 6 March 2011, N. Masakazu s n. (KYO).

Plants belonging to sect. *Codonanthus* are small and relatively difficult to find during the

flowering season. This means that *G. shimizuana* and other undescribed species may possibly be mistaken for more common *Gastrodia* species such as *G. nipponica*, which has similar phenology. Extensive surveys during the flowering season are urgently required in order to reveal the precise distribution of species of sect. *Codonanthus* in the Ryukyu Islands.

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- ナンゴクヤツシロランの北限新産地 (末次健司^a, 仲間正和^b, 渡邊たづ子^c, 渡邊宏満^c, 横田正嗣^d)
- 沖縄本島北部でナンゴクヤツシロラン *Gastrodia shimizuana* Tuyama の開花個体を発見した。これは、西表島、台湾に次ぐ産地となり、分布の北限となる。オニノヤガラ属の *Codonanthus* 節に属する種は開花期間が短く、結実個体では同定困難なものが多いため、琉球列島の *Codonanthus* 節に属する種の分布状況の詳細な検討が望まれる。
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